Ontario Species at Risk Evaluation Report

for

Eastern Box Turtle (*Terrapene carolina*)

Committee on the Status of Species at Risk in Ontario (COSSARO)

Assessed by COSSARO as Extirpated

May 2015

Final

Tortue boîte de l’Est (*Terrapene carolina*)

La tortue boîte de l’Est (*Terrapene carolina*) est une petite tortue qui possède une dossière légèrement carénée et fortement bombée. Le plastron porte une charnière qui permet aux deux lobes de se refermer complètement sous la carapace. Cette espèce est répartie un peu partout dans l’est de l’Amérique du Nord, dans le sud de la Floride, et compte des sous-populations isolées au Mexique. Elle est associée aux habitats de feuilles ouverts et de boisés mixtes ainsi qu’aux champs et aux terres humides qui les bordent. L’habitat de nidification est principalement constitué de parcelles ouvertes de sol sablonneux ou limoneux. Elle hiberne généralement sur la terre dans des zones où le sol est meuble et où il y a une abondante couche de feuilles mortes, mais il lui arrive parfois d’hiberner sous l’eau. Cette espèce est le plus grand animal au monde qui peut tolérer le gel. Cette tortue a été aperçue, au fil du temps, dans le sud de l’Ontario, comme en témoignent les sites archéologiques et les observations sporadiques au cours des 55 dernières années, mais comme il n’y a pas de populations en âge de reproduction connues à l’heure actuelle, elle a été évaluée comme une espèce disparue. Les populations de cette espèce au Canada auraient diminué en raison de la surexploitation et des pertes d’habitat, mais les raisons exactes sont inconnues.

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Executive summary

The Eastern Box Turtle (*Terrapene carolina*) is a small turtle with a slightly keeled, high-domed carapace. The plastron has a hinge which allows the two lobes to completely close against the underside of the carapace. This species ranges across much of eastern North America, south to Florida with disjunct subpopulations in Mexico. It is associated with open deciduous and mixed woodland habitats, as well as adjacent fields and wetlands. Nesting habitat is primarily open sandy or loamy soil patches. They typically hibernate on land in areas with loose soil and abundant leaf litter, but occasionally hibernate under water. This species is the largest animal in the world that can tolerate freezing. The species was known historically to have occurred in southern Ontario from archeological sites and sporadic observations over the past 55 years, but currently there are no known breeding populations and thus is assessed as Extirpated. The Canadian populations of this species are thought to have declined due to overharvesting and habitat loss, but the exact reasons are unknown.

1. Background information

1.1. Current designations

- G-RANK: G5 (NatureServe 2015)
- N-RANK Canada: NU
- COSEWIC: Extirpated (Nov 2014)
- SARA: No status
- ESA 2007: No status
- S-RANK: SX
- IUCN Red List: VU

1.2. Distribution in Ontario

The known presence of this species in Ontario is based on Aboriginal Traditional Knowledge and archeological evidence. Bones, bowls and rattles from this species have been uncovered at archeological sites (COSEWIC 2014). Over 24 rattles at 10 sites have been uncovered at 34 sites and date back to 1300-1400 (Figure 3 in COSEWIC 2014).

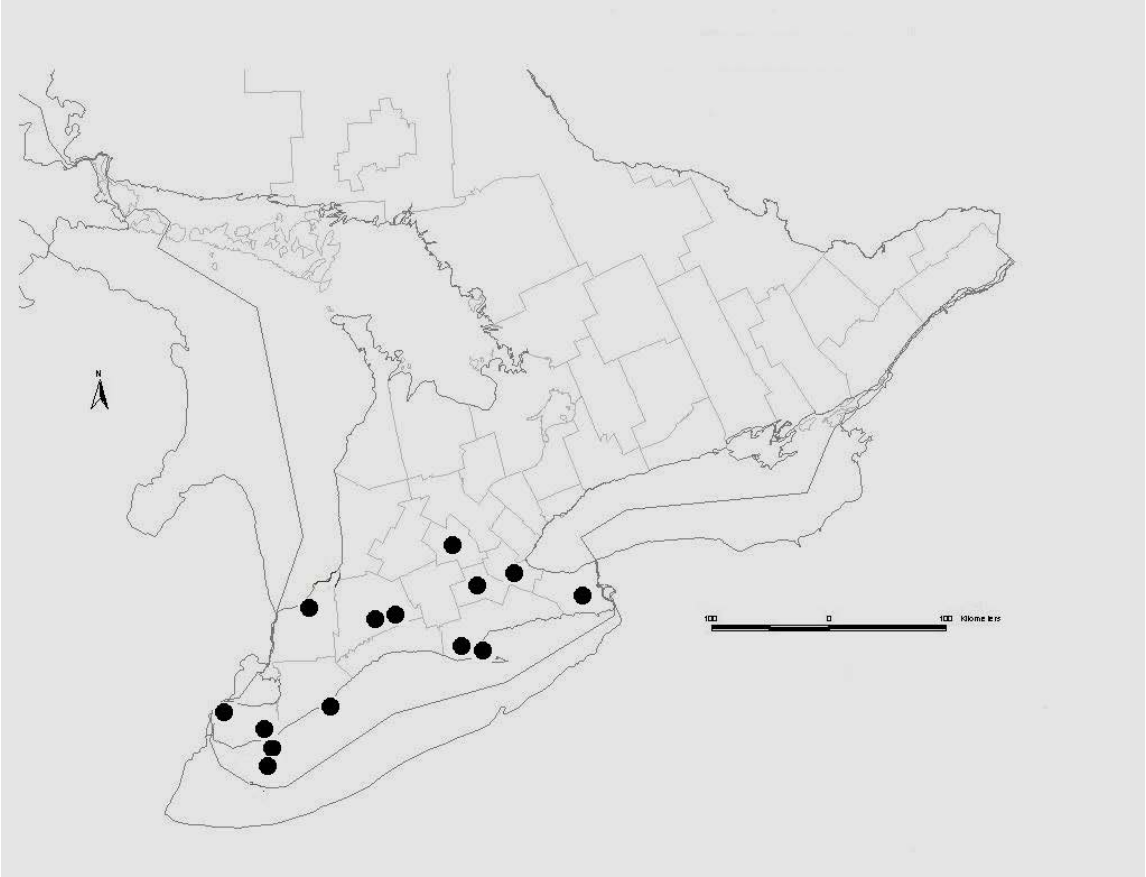
During the 20th century, the Eastern Box Turtle was first reported in Ontario in 1960 when one individual was photographed at Point Pelee National Park. Individuals were later observed at many other localities in southwestern Ontario (see Tables 2 and 3; COSEWIC 2014). Of all reports (from nine counties), Essex County has the most reports, even excluding the observations from Point Pelee National Park (COSEWIC 2014).

All sightings in recent decades have been individuals, not breeding populations, indicating they were released pets (COSEWIC 2014). Specimens of other Eastern Box Turtle subspecies determined to be released pets were present in Ontario as early as 1963 and suggests that all *T. carolina* found in Ontario from 1960 onward could be released pets (COSEWIC 2014).

1.3. Distribution and status outside in Ontario

The species occurs throughout the Eastern United States from central Michigan, south to Florida, west to Texas (COSEWIC 2014). The northern limit of its current range occurs just under the Great Lakes, including Pennsylvania, Ohio, Michigan and New York (COSEWIC 2014). Extant populations in southeastern Michigan and northeastern Ohio are less than 100 km from Essex County in southern Ontario (COSEWIC 2014), however, it is known to have previously occurred along the shores of the Great Lakes in these states. Although the species is considered globally secure (G5), most remaining box turtle subpopulations in the USA have densities far below optimal sizes and are poor at rebounding from adult death (COSEWIC 2014). There is also one report of a *T. carolina* from near Montréal in Québec in 1988 (Bider and Matte 1991 as cited in COSEWIC 2014).

Figure 1. Approximate locations of observations of Eastern Box Turtle (*Terrapene carolina*) from southern Ontario from the 20th century. See Tables 2 and 3 in COSEWIC (2014) for detailed information on observations. Map created by D. Seburn (from COSEWIC 2014).



1.4. Ontario conservation responsibility

Less than 5% of its historical range occurs in Ontario (see Figure 2 in COSEWIC 2014).

1.5. Direct threats

The reasons for the decline of this species are unknown. The apparent distribution and pattern of loss suggests that native Ontario *T. carolina* became extirpated as a result of habitat loss and overharvesting (COSEWIC 2014). This species has not occurred in Ontario for hundreds of years, thus we are uncertain as to what threats are implicated in its extirpation.

1.6. Specialized life history or habitat use characteristics

Among the 20 chelonian genera found in the United States and Canada, *Terrapene* has a lowest median clutch size (4-6 eggs) (Belzer and Seibert 2009 as cited in COSEWIC 2014).Turtle populations, in particular, tend to be particularly vulnerable to adult mortality due to delayed age of maturity and low reproductive rates.

2. Eligibility for Ontario status assessment

2.1. Eligibility conditions

2.1.1. Taxonomic distinctness

Yes.

2.1.2. Designatable units

Yes, although divided into three subspecies across its range, only one subspecies (*T. c. carolina*) occurs in Canada/ON and thus can be considered at the species level (COSEWIC 2014).

2.1.3. Native status

Yes, archeological sites have documented the presence of this species in Ontario since at least 1000 A.D. (COSEWIC 2014). Given known historic occurrences of this species in regions of New York, Ohio and Michigan that border the Great Lakes there is a very high probability that this species once colonized Ontario through dispersal via the Great Lakes or on land bridges that existed during the hypsithermal period (~ 5.5 - 4.5 thousand years ago).

2.1.4. Occurrence

There has been no evidence of a breeding population present in Ontario for hundreds of years.

2.2. Eligibility results

The Eastern Box Turtle (*Terrapene carolina*) is eligible for status assessment in Ontario.

3. Ontario status assessment

3.1. Application of endangered/threatened status in Ontario

3.1.1. Criterion A – Decline in total number of mature individuals

Does not apply. This species has not occurred in Ontario for much longer than 3 generations.

3.1.2. Criterion B – Small distribution range and decline or fluctuation

Does not apply. While individuals have been seen these are likely released pets. Since there have not been breeding populations present in Ontario for more than 50 years, this cannot be calculated.

3.1.3. Criterion C – Small and declining number of mature individuals

Does not apply. All recent sightings have been released individuals.

3.1.4. Criterion D – Very small or restricted total population

Does not apply. Breeding populations have not been present in Ontario for >50 years

3.1.5. Criterion E – Quantitative analysis

Does not apply.

3.2. Application of Special Concern in Ontario

Does not apply.

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Does not apply.

3.3.2. Rescue effect

The Eastern Box Turtle naturally occurs in Ohio, Pennsylvania, New York and Michigan (COSEWIC 2014). There are no extant populations within 100 km of Ontario in New York, thus rescue from New York is highly unlikely (COSEWIC 2014). Populations in Michigan are less than 50 km from the Ontario border, but migration is unlikely given that the maximum known dispersal distance for *T. carolina* is only 10 km (COSEWIC 2014) and since it has not yet occurred since the species has been extirpated >50 years ago. Additional factors such as land use change, high rates of nest predation and road mortality also make it unlikely that sufficient numbers of adults will successfully migrate (COSEWIC 2014). Similar difficulties make rescue from Ohio or Pennsylvania highly improbable (COSEWIC 2014).

3.4. Other status categories

3.4.1. Data deficient

This species was previously considered data deficient. New archeological evidence has been analyzed and the change in status reflects this.

3.4.2. Extinct or extirpated

Intensive turtle surveys at Point Pelee National Park during 2001-2002 resulted in the capture of 1,977 turtles, but no *T. carolina* (COSEWIC 2014). There have not been surveys specifically targeting this species but there have been for other reptiles in many areas of southern Ontario, including sites where it has been previously observed (e.g., Rondeau Provincial Park, Port Franks, Pelee Island, etc.) and other areas with potential

habitat (Long Point National Wildlife Area, Pinery Provincial Park, Skunk's Misery, etc.) (COSEWIC 2014). There is an estimated number of four or five individual Eastern Box Turtles in Ontario, which does not support a sustainable breeding population and it is likely that these individuals were released (COSEWIC 2014).

3.4.3. Not at risk

Does not apply.

4. Summary of Ontario status

Eastern Box Turtle (*Terrepene carolina*) is classified as Extirpated in Ontario. Despite occasional sightings of (likely released) individuals, it is unlikely that there are, or have been in the past 50 years, extant populations of this species in Ontario.

5. Information sources

Belzer, W.R. and S. Seibert. 2009. How do male box turtles find mates? Turtle and Tortoise Newsletter 13:11-21.

Bider, J. R. et S. Matte. Compilers. 1991. Atlas des amphibians et des reptiles du Québec 1988-89. Version detailes. Societe d'Histoire Naturelle de la Vallee du St-Laurent, Ste-Anne-de-Bellevue, Québec, et Ministere du Loisir, de la Chasse et de la Peche, Direction de la Gestion des Especes et des Habitats, Service des etudies ecologiques, Québec.

COSEWIC. 2014. In Press. COSEWIC assessment and status report on the Eastern Box Turtle *Terrapene carolina* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 36 pp.

NatureServe. 2015. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. [website accessed 1 May 2015].

Appendix 1: Technical summary for Ontario

Species: Eastern Box Turtle (*Terrapene carolina*)

Demographic information

Demographic attribute	Value
Generation time. Based on average age of breeding adult: age at first breeding = X year; average life span = Y years.	~28 years (3 generations = 84 yrs)
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	No, there are no known extant populations in Ontario
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	n/a
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.	n/a
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	n/a
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over any 10 years, or 3 generations, over a time period including both the past and the future.	n/a, Species extirpated >85 years ago.
Are the causes of the decline a. clearly reversible and b. understood and c. ceased?	Causes of the decline in the past are probably loss of forest habitat and overharvesting. Causes have ceased but are not reversible if the species is extirpated.
Are there extreme fluctuations in number of mature individuals?	No

Extent and occupancy information in Ontario

Extent and occupancy attributes	Value
Estimated extent of occurrence. *(Request value from MNRF or use http://geocat.kew.org/)*	0 km^2

Index of area of occupancy (IAO). *(Request value from MNRF or use http://geocat.kew.org/)*	0 km^2
Is the total population severely fragmented? (i.e. is >50% of its total area of occupancy is in habitat patches that are (a) smaller than would be required to support a viable population, and (b) separated from other habitat patches by a distance larger than the species can be expected to disperse?)	a. No b. No
Number of locations (*as defined by COSEWIC*).	unknown
Number of NHIC Element Occurrences (*Request data from MNRF)*	n/a
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	No
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	No
Is there an observed, inferred, or projected continuing decline in number of populations?	No
Is there an observed, inferred, or projected continuing decline in number of locations?	No
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	No
Are there extreme fluctuations in number of populations?	No
Are there extreme fluctuations in number of locations?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of mature individuals in each sub-population or total population (if known)

Observed from 2009-2013:

- Point Pelee National Park: 2-3
- Dundas: 1
- Windsor: 1

Quantitative analysis (population viability analysis conducted)

Not available.

Rescue effect for the Eastern box Turtle

Rescue effect attribute	Likelihood

Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Possible but unlikely
Would immigrants be adapted to survive in Ontario?	Yes
Is there sufficient suitable habitat for immigrants in Ontario?	Small populations could probably be sustained in a few areas such as Rondeau and Point Pelee Parks.
Is the species of conservation concern in bordering jurisdictions?	Yes
Is rescue from outside populations reliant upon continued intensive recovery efforts?	Unknown, but probably

Appendix 2: Adjoining jurisdiction status rank and decline

Information regarding rank and decline of Eastern Box Turtle

Jurisdiction	Subnational rank	Population trend	Sources
Ontario	SU	n/a	NatureServe 2015
Quebec	Not present	n/a	n/a
Manitoba	Not present	n/a	n/a
Michigan	S2S3	Declining, State listed as Special Concern	COSEWIC 2014
Minnesota	Not present	n/a	n/a
Nunavut	Not present	n/a	n/a
New York	S3	Vulnerable, listed as Special Concern	COSEWIC 2014
Ohio	S4/S5	Apparently Secure but listed as Special Concern	COSEWIC 2014
Pennsylvania	S3S4	Vulnerable/Apparently secure	COSEWIC 2014
Wisconsin	Not present	n/a	n/a

Acronyms:

COSEWIC: Committee on the Status of Endangered Wildlife in Canada
COSSARO: Committee on the Status of Species at Risk in Ontario
ESA: Endangered Species Act
GRANK: global conservation status assessments
IAO: index of area of occupancy
MNRF: Ministry of Natural Resources and Forestry
NHIC: Natural Heritage Information Centre
NNR: Unranked
NRANK: National conservation status assessment
SARA: Species at Risk Act
SNR: unranked
SRANK: subnational conservation status assessment
SU: Unrankable
S2: Imperiled
S3: Vulnerable
S4: Apparently Secure
S5: Secure
IUCN: International Union for Conservation of Nature and Natural Resources